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RECENT CONTRIBUTIONS TO THE MARINE INVERTEBRATE FAUNA OF IRELAND.

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The following summary of papers published within the last two years is intended to inform naturalists of the more interesting species of marine Invertebrates which have recently been recorded from Irish waters, many of which were previously unknown to occur in Ireland.

I. *The Foraminifera of Galway.* By F. P. Balkwill and F. W. Millet. Journal of Microscopy and Natural Science, iii. pp. 1—22, pls. i.—iv. (1884).

In taking a general review of the Foraminifera of Galway, "there may be noticed the absence of *Biloculina ringens*, the moderate frequency of *Miliolina fusca* and *Ammodiscus gordialis*, and the occurrence of a few fine specimens of *A. shoneana*. The flattened forms of *Lagenæ* are remarkably abundant, giving rise, as might be expected, to varieties; among the rarer forms are *Lagena pulchella*, *L. faba*, *L. bicarinata*, *L. fimbriata*, and *L. clathrata* (the last two not having been previously recorded as British species), and a variety between *L. clathrata* and *L. castrensis*."

"*Lingulina carinata* occurs. The *Nodosarinæ*, *Dentalinæ*, and *Cristallariæ* are but poorly represented. Among the *Polymorphinæ* we have the rare *Polymorphina myristiformis*, *P. complanata*, a

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species new to Great Britain, and an example of *P. compressa* with a short Entosolenian tube. *Globigerina bulloides* occurs plentifully, and is accompanied by the rarer *G. inflata*."

"Among the *Textulariæ* and *Bolivinæ*, *T. difformis* is remarkably frequent; *B. lævigata* and *B. dilatata* are also more common than is usual on the east coast of Ireland: on the other hand, the rarity of *Verneuilina polystropha* is equally striking."

"The Buliminas, including *Virgulina schreibersii*, are well represented, and the material is especially rich in its *Cassidulinæ* and *Discorbinæ*; *Discorbina parisiensis* and *D. wrightii* are very frequent. The latter often occurs double, and sometimes treble. *D. orbicularis*—first noticed as British by Balkwill and Wright (*vide infra*) in their Dublin shore-gatherings—seldom occurs in the typical form, but its wild-growing variety is extremely common. *Operculina ammonoides* is not often met with."

Some new varieties of *Lagenæ* are figured, and a species of *Ramulina* new to Britain, which is not named. *Lagena faba*, sp. n., is both described and figured (p. 13, pl. ii. fig. 10).

II. *Note on the Occurrence of some Foraminifera in the Irish Sea.* By C. Elcock. Ann. and Mag. Nat. Hist. (5), xiv. pp. 366—7 (1884).

The following were obtained south-west of the Isle of Man from 70 to 75 fathoms:—*Technitella legumen*, Norm., *Lagena hertwigiana*, Brady. The first Irish locality recorded for both species; also *Hyperammina elongata*, *Reophax scorpiurus*, *Haplophragmium pseudospirale*, &c.

III. *Report on some recent Foraminifera found off the Coast of Dublin and in the Irish Sea.* By F. P. Balkwill and J. Wright. Trans. R. Irish Acad. xxviii. (Science), pp. 317—372, pls. xii.—xiv. (1885).

This is an admirable Report on the Foraminifera obtained off the Dublin coast, of which an abstract appeared in the Proc. Roy. Irish Acad. (2nd ser.), iii. (Science), 1883, p. 545—550.

The following species are figured:—*Biloculina ringens*, Lamk., var.; **Spiroloculina acutimargo*, Brady, woodcut; *Miliolina tenuis*, Czjzek; *M. subrotunda*, Mont.; *M. ferussacii*, d'Orb., var., near *M. sclerotica*, Karrer; *M. agglutinans*, d'Orb.; **Ophthalmidium carinatum*, nov. sp.; *Cornuspira foliacea*, Phil.; *C. in-*

volvens, Reuss.; *Hyperammina elongata*, Brady; *Reophax scorpiurus*, Montf.; *R.* (?) sp.; *Haplophragmium pseudospirale*, Will.; **H. agglutinans*, d'Orb.; *Ammodiscus charoides*, J. & P.; *Trochaminata inflata*, Mont., var.; *Textularia sagittula*, Defr.; *T. gramen*, d'Orb.; *Spiroplecta biformis*, J. & P., and woodcut; *Lagena lineata*, Will.; *L. aspera*, Reuss.; **L. curvilineata*, nov. sp.; *L. sulcata*, W. & J.; *L. costata*, Will.; *L. williamsoni*, Alc.; *L. crenata*, P. & J.; *L. striato-punctata*, P. & J.; **L. feildeniana*, Brady; *L. squamosa*, Mont.; *L. lagenoides*, Will.; *L. bicarinata*, Terqu.; **L. castrensis*. Schwager; *L. pulchella*, Brady; *Nodosaria raphanus*, Linn.; *N. pyrula*, d'Orb.; **N. hispida*, d'Orb.; * (?) *Rhabdagonium tricarinatum*, d'Orb.; *Marginulina glabra*, d'Orb.; *Polymorphina spinosa*, d'Orb.; *Pullenia sphæroides*, d'Orb.; **P. quinqueloba*, Reuss.; *Spirillina vivipara*, Ehrenb.; **Discorbina orbicularis*, Terq.; **D. tuberculata*, nov. sp.; **Nonionina pauperata*, nov. sp.; **N. boueana*, d'Orb.

Of the 147 species and varieties recorded, 13 are new to Britain (indicated in the above list by an asterisk *), and 3 are new to Science.

IV. *Report on Irish Zoophytes*. Part I. On some Rare Sea Anemones taken at Greystones, Co. Wicklow, with Remarks on the Marine Invertebrate Fauna of that District. By H. W. Mackintosh, Proc. R. Irish Acad. (2), IV. (Science), pp. 52—58 (1884).

The two following *Actiniæ* are new to Ireland: *Bolocera* (?) *eques*, Gosse, which the author considers belongs to the genus *Tealia*, and *Stomphia churchiæ*, Gosse; both from twelve fathoms off Greystones. *Adamsia palliata*, Johnst., var. *rhodopis*, Gosse, from twelve fathoms off Greystones, and also from Portrush. *Aureliana heterocera*, Thomps., is recorded from between tide-marks at Greystones. [This requires confirmation, as it was seen by a young friend of Prof. Mackintosh's, and not by himself. —A. C. H.]

An account is given of the nature of the ground and of the *facies* of the fauna of that district, as also a list of common Mollusca.

Loligo magna [sic] (= *L. vulgaris*) is very abundant.

"Occasionally, but very rarely, *Octopus vulgaris* is taken in the seines, but this species seems to frequent deeper water than

Loligo, and so is seldom seen. Last August [1883], when walking along the North Strand, I counted five successive hauls of *Loligo*, making a total of at least one hundred and fifty specimens, and in one of the larger hauls occurred a small *Octopus*, the only one I have seen; I was told by one of the fishermen that they are sometimes taken on the long lines during winter and spring."

[I have quoted this at length, as there is a certain amount of interest attached to the occurrence of the *Octopus* in Ireland. Forbes and Hanley say:—"Dr. Robert Ball procured it at Plymouth in 1841. The reputed Irish localities are very doubtful," vol. iv. p. 210. Gwyn Jeffreys also states:—"Irish coasts, 'not uncommon' (Templeton, *fide* Thompson). But *Eledone cirrosa* may have been in many cases mistaken for this species," vol. v. p. 144. The exact statement in Thompson's 'Natural History of Ireland,' vol. iv. p. 270, is—"*O. vulgaris*, Lam. Not uncommon, Temp. MSS. (Probably the following species is meant.—*R. Ball*)." In the 'Report of the British Association for 1840,' p. 249, Thompson says "the omission of *Eledone octopodia* [*E. cirrhosa*] from his [Templeton's] catalogue, leads me to believe that this latter was the species meant." In the 'Guide to the City and County of Dublin,' Hodges, Forster, and Figgis, 1878, pt. ii. Fauna, p. 70, Dr. A. Macalister (now of Cambridge) is answerable for *Octopus vulgaris* having been found at Bray. There is, in the Dublin University Museum, a specimen of a true *Octopus* from "Dublin Bay," but with no history, and therefore of doubtful authenticity. Lastly, we have the record just quoted, but concerning which it is necessary to say a few words. Prof. Mackintosh informs me that he did not take away the specimen he saw lying on the shore, and consequently did not compare it with any description; but he is morally certain that his identification is correct. The fisherman's statement merely refers to a short-bodied Octopod as opposed to a Squid, and this evidence is worthless, as, in common with other local naturalists, I can testify that *Eledone cirrhosa*, Lam., is commonly caught during the winter months on fishermen's lines off the piers at Kingstown, and they have also been found stranded there on the beach by Mr. Dixon, who showed them to me. The direct evidence of the Irish habitat of *Octopus vulgaris* is thus narrowed to the statements of Professors Macalister and

Mackintosh, with no specimens to support them, and a specimen in the Museum of Trinity College, Dublin, labelled "Dublin Bay," and said to have been presented by the late Mr. Goode.—A. C. H.]

Two specimens of *Tritonia hombergii* were taken.

Amongst the Crustacea may be noted *Ebalia pennantii*, *Atelecyclus heterodon*, *Pagurus ulidianus*, *Munida rondeletii*, &c.

Very few Worms and Ascidians are mentioned. The Echinodermata are *Comatula rosacea* (scarce), *Ophiura texturata* and *O. albida* (both rather scarce), *Ophiocoma neglecta* (scarce), *O. granulata* (not very common, but remarkably large), *Ophiothrix rosula* (prodigious numbers), *Asterias rubens*, *Cribrella oculata*, *Solaster papposa* (very abundant, often of large size), *Asterias gibbosa* (not very common), *Echinus esculentus*, *E. miliaris* (both very common). No *Holothuria* were obtained.

Rhizostoma pulmo, *Aurelia aurita*, *Pleurobrachia pileus*, and *P. pomiformis* are noted, and one or two common sponges.

V. *A New Species of Halcampa* (*H. Andresii*) *from Malahide.* By A. C. Haddon, Proc. R. Dub. Soc. (N. S.), iv. pp. 396-8, pl. xvi. figs. 1—4 (1885).

Upon a subsequent examination of a number of individuals this species was withdrawn at the November meeting of the Royal Dublin Society of the same year (*cf.* Ann. and Mag. Nat. Hist. (5th ser.), xvi. (1885), p. 523, and *infra*), as it proved to be a variety of that extremely variable species, *H. chrysanthellum*, Gosse. It was first found in Ireland by Miss Shannon in September, 1883, at Malahide, Co. Dublin.

VI. *The Structure and Habits of Peachia hastata* (Gosse). By A. C. Haddon and G. J. Dixon. Ibid., pp. 399—406, pl. xvi. figs. 5—8, and pl. xvii. xviii. (1885).

This species was first found in Ireland (Dollymount, Dublin Bay) by Mr. Dixon, and exhibited by him before the Royal Dublin Society on Nov. 17th, 1884. The paper gives a full bibliography and a careful description with additional notes on the habits of this interesting form. The synonymy is *Actinia cylindrica*, Reid, and *Siphonactinia hastata*, Andres (Gosse sp.).

VII. *Preliminary Report on the Fauna of Dublin Bay.* By A. C. Haddon, Proc. Royal Irish Acad. ser. 2, IV. Science, pp. 523—530. (1885).

A short account of forms new to Dublin Bay and the neighbouring coast, or which are otherwise interesting :—**Haliphysema tumanowiczii*, Bow, from Dalkey Island, is the only rhizopod noted. The hydroids noticed are *Coryne pusilla*, Gärtn., *C. vaginata*, Hincks, **Garveia nutans*, T. S. Wr., *Tubularia indivisa*, Linn., and *T. humilis*, Allm.; all from Dalkey Island. **Syncoryne eximia*, Allm., **Corymorpha nutans*, Allm. (? of Sars), and **Eudendrium capillare*, Ald.; from Scotch Bay, Kingstown. **Obelia flabellata*, Hincks, *Gonothyræa lovéni*, Allm., *Lafoëa pocillum*, Hincks, **L. pygmæa*, Ald., **Diphasia attenuata*, Hincks.

The following Medusæ were obtained :— *Steenstrupia rubra*, Forbes (= *Corymorpha nutans*, Allm.), *Sarsia tubulosa*, *S. pattersonii*, sp. nov. (provisional name for the form described in Forbes' 'Naked Eyed Medusæ,' p. 56, which was found by Mr. Patterson at Larne, Co. Antrim, and which also occurs in Dublin Bay), *Tiara octona*, Forbes, *Thaumantias hemispherica*, Gron., *T. inconspicua*, Forbes, **T. globosa*, Forbes. Our knowledge of the forms usually included under the genus *Thaumantias* is at present in a very unsatisfactory condition. *Margelis britannica*, Forbes (the nomenclature of this species is discussed). *Dipleurosoma hemispherica*, Allm., a remarkable Medusa with irregular gastrovascular canals and generative organs, first described by Allman ('Nature,' ix. 1873, p. 73) as *Ametrangia hemispherica*, and renamed by Haeckel *D. irregulare*. [It is just possible that this is the same form as that described by J. R. Greene (Nat. Hist. Rev. iv. 1857, p. 245, pl. xiv. fig. 2, A, B) as *Equorea formosa*, n. s.; if this proves to be the case, Greene's specific name will, of course, take precedence.—A. C. H.]

A minute and immature Siphonophore was found in Dalkey Sound, which was doubtfully referred to as *Agalmopsis sarsii*, Köll.

The following are the Sea Anemones recorded :—**Edwardsia* sp. incert., a minute and immature form of a uniform pale pink colour from Salthill; *Halcampa chrysanthellum*, Peach, from Malahide; *Heliactis bellis*, Ellis, Malahide and Dalkey; *H. venusta*, Gosse, vars. *rosea* and *nivea*, Dalkey; *H. miniata*, Gosse, Dalkey, and off Bray Head in twenty-three fathoms; *Cylista undata*, Müll., Monkstown and Dalkey. One or two specimens of the parasitic Medusa, **Halcampa fultoni*, T. S. Wr., were found on species of *Thaumantias*. Several stages of development were observed, and this parasite will probably prove to be the larval form of *Halcampa chrysanthellum*. *Caryophyllia borealis*, Flem., var. *esmeralda*, was found at Dalkey by Mr. H. W. Jacob.

The following Vermes are recorded:—**Planaria ulvæ*, Oerst.; **Tetrastemma dorsalis*, Abildg.; **T. candida*, Müll.; **T. flavida*, Ehr.; *Lineus marinus*, Mont.; *Amphiporus lactifloreus*, Johnst.; *Tomopteris scolopendra*, Q. & G.; *Sagitta bipunctata*, Krohn; *Pedicellina cernua*, Pall.; *Bowerbankia imbricata*, Ad. (sessile form); **B. caudata*, Hincks; **Diastopora obelia*, Johnst.?; **Scrupocellaria scrupea*, Busk; and **Ætea truncata*, Landsb.

The Mollusca are:—*Eolis drummondi*, Thomp., **E. lineata*, Lov., **E. despecta*, Johnst., **E. exigua*, A. & H.; all from Kingstown. *Proctonotus mucroniferus*, A. & H. This last species was discovered by Alder and Hancock at Malahide in September, 1843, and now again in the same place in September, 1885. The only other recorded locality is Lamlash Bay in 1881 (Herdman). Also *Polycera quadrilineata*, Müller, *Eledone cirrhosa*, Lam., and others.

Of the Echinodermata, *Echinocyamus angulatus*, Leske (= *E. pusillus*), off Bray Head in twenty-three fathoms, and *Synapta inhærens*, Müll., found by Messrs. Jacob and Dixon at Malahide, are the only forms not previously recorded for Co. Dublin. [Since writing the paper here quoted I have learned that Dr. Kinahan found several specimens of *S. inhærens* at Sutton, Co. Dublin, about the year 1860, and he exhibited them, with mounted specimens of the skin, at the Dublin Microscopical Club at the time. I have recently seen a slide of the latter, and can vouch for the identification being correct, but, so far as I can learn, no record was made of it at the time or since.—A. C. H.]

All the specimens marked with an asterisk *, so far as can be discovered, have not before been recorded as occurring in Ireland.

VIII. *Note on Halcampa chrysanthellum*, Peach. By A. C. Haddon, Proc. R. Dub. Soc. (N. S.) v. p. 1, figs. 1—4 (1886).

A critical note on this species, the following being synonyms:—*Edwardsia duodecimcirrata*, Sars.; *Xanthiopus bilateralis*, Kef.; *X. vittatus*, Kef.; *Halcampa kefersteini*, Andres; *H. andresii*, Hadd. Several varieties are described, and a new description is given, which takes into account the wide range of variation of the species.

ON THE WOLF OF NIPPON.

By Prof. Nehring, of Berlin.*

In reference to the important and suggestive remarks on the Mammalia of Japan and their geographical distribution, recently published by Dr. D. Brauns,† I venture to make some observations on the Wolf found in the Isle of Nippon, reserving some further remarks on a few other species for another occasion.

The Japanese Wolf, as is well known, has been identified by Temminck as *Canis hodophylax*,‡ and is said to differ from the Common Wolf, *Canis lupus*, Linn. (= *Lupus vulgaris*, Gray), by its smaller size, relatively shorter legs, and also by its different colour. Von Schrenck, however, a thoroughly profound critic on the subject,§ upset the distinctive characters pointed out by Temminck, especially demurring to a belief in the existence of any anomalous proportions of the leg-bones. Prof. Brauns, also on the opinion of von Schrenck, declares the Japanese Wolf identical with *Canis lupus*, in opposition to his previously expressed views on the subject.||

Being in possession of a well-preserved skull of a full-grown Japanese Wolf of moderate age, I am in a position to express an independent opinion on the subject. The skull in question belongs to the Anatomical Museum of Berlin (register No. 25,546),

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* Translated from the German in 'Der Zoologischer Garten,' 1885, pp. 161—170.

† "On the Geographical Distribution of Mammalia in Japan," in Mitth. d. Ver. f. Erdkunde. Halle-o.-S., 1884.

‡ See Temminck, 'Fauna Japonica,' p. 38, fig.

§ L. von Schrenck, 'Reisen im Amur-Lande,' i. p. 47.

|| In 'Chrysanthemum,' Feb. 1881.

lent to me by Prof. R. Hartmann. The Museum authorities received it in 1877, with some other skulls of Japanese Mammalia collected by Dr. Dönitz in Nippon, although I am unable to state whether he actually procured it himself.

With regard to the cranial bones, their general appearance as well as the condition of the teeth show that this skull undoubtedly belonged to a wild animal, and not to any domesticated one. The profile is prolonged, the forehead being remarkably flat, the parietal crista distinctly and prominently developed in its posterior portion. The malar bones are widely separated, indicating very strong muscles for the purpose of mastication. The upper incisors and the upper premolars are considerably worn, whilst the corresponding teeth of the lower jaw and all the molars present but slight traces of having been used. Without going into a detailed description, I merely wish to state that this skull of a Japanese Wolf is much smaller than some full-grown wild living specimens of the common European Wolf. The total length amounts to 213 mm., the length of the base from the anterior edge of the occipital foramen to the point between the middle incisors only 185 mm.; the upper sectorial tooth has a length of 22·5 mm.; both the upper molars, 23 mm.; the lower sectorial tooth, 25·5 mm. The extreme width of the skull measured across the malar bone is 123 mm.

On comparing these dimensions with those of some typical specimens of *Canis lupus*,* it will be found that they are perceptibly inferior, although I found them to accord somewhat with some full-grown specimens of the Indian Wolf, *Canis pallipes* (= *Lupus pallipes*, Gray). For instance, the sagittal suture in the skull of an old male of the last-mentioned species† measures 214 mm.; the basicranial axis 190 mm.; the width between the zygomatics, 126 mm.; the upper sectorial tooth, 22 mm.; the lower one, 24 mm.; and both the other tuberculated teeth, 22·4 mm. Again, the skull of *Canis pallipes* is somewhat larger than that of the Japanese Wolf, but the dentition is rather more feeble.

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* Compare my detailed measurements of the skulls of two wolves (male and female) from Gallicia; Sitzgsber. d. Gesell. naturf. Freunde in Berlin, Nov. 18th, 1884.

† Zool. Coll. of the Agricult. College at Berlin, No. 1210 of the Nathusius Collection.

The skull of a male *Canis pallipes* obtained during the travels of Messrs Schlagintweit Bros., and now in our collection, is of the following dimensions:—Cranial length, 210 mm.; basilar length, 181 mm.; width across the malar bones, 112 mm.; upper sectorial tooth, 21 mm.; both the upper tuberculated teeth, 24·3 mm.; and the lower sectorial tooth, 24·8 mm. A skull of *Canis pallipes* mentioned by Prof. Huxley,* has a sagital length of 215 mm.; the upper sectorial tooth measuring 21·5 mm., the lower one, 24·5 mm.; and both the upper tuberculated ones, 23 mm. It results from these comparisons that the skull in question of the Japanese Wolf is of about the same size as that of the Indian Wolf, the dentition only being stronger. As regards the shape of the teeth, I find many points of comparison with the Indian Wolf, only the shape of the bullæ osseæ is an anomalous one, for they are more protuberant in the latter, while in the Japanese Wolf they appear to be smaller and flatter. In addition to this the Japanese Wolf has a remarkably flat and narrow frontal bone,† which in the Indian Wolf is distinctly vaulted and has a greater breadth. In general the skull of the Japanese Wolf has, in spite of many analogies with that of the Indian Wolf, more or less a peculiar stamp of its own, and I should be able to pick it out at once from forty other skulls of wolves which I am dealing with.

Temminck, in his 'Fauna Japonica,' states explicitly (p. 39) that the skull of the Japanese Wolf is smaller than that of the European Wolf, pointing out that he had a full-grown specimen in his possession, adding further that Siebold also possessed a very old individual of exactly similar dimensions. These statements agree precisely with the details afforded by the skull in question, and there is no reason to doubt them.‡ That which discredited Temminck's statement, and gave von Schrenck good reason to criticise, was the erroneous description of the "*avant-bras*" or fore arm, called "radius," instead of "radius and ulna." Properly speaking, there exists no species of the genus *Canis* in which the radius, measured by itself, exceeds the length of the tibia; but, as a rule, the fore arm—*i. e.* the radius and ulna, measured together—is generally longer than the tibia, and the variations are by no means so important as von Schrenck considered them.

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* "Cranial and Dental Measurements of Wolves of the Old World," Proc. Zool. Soc. London, 1880, p. 279.

† Whether this is the case with all the specimens will be a point for further observation.

‡ I cannot admit that the remarks on the subject by Prof. Brauns are sufficiently confirmed.

The following table will justify the facts stated. The measurements were taken from disarticulated skeletons in our collection, in order to get the exact measure of each bone from one extreme end of the joint to the other.

The measurements are given in millimètres.				Greatest Length.			Basilar Length of Skull.
				Ulna.	Radius.	Tibia.	
Canis lupus,	♂,	adult,	Lorraine ...	249	212	228	217
,, ,,	♂,	,,	Turkey ...	256	217	230	213
,, ,,	♂,	,,	Finland ...	252	213	231	212
,, ,,	♀,	,,	Gallicia ...	231	196	216	215
,, ,,	♀,	juv.,	Gov. Kaluga	227	193	212	197
,, *pallipes,*	♂,	adult,	India ..	216	185	198	190
,, *hodophylax,*		,,	*fide* Temm.	202·5 *	?	176	(185 ?)†
,, *dingo,*	♂,	,,	Australia ...	177	148	166	166
,, *latrans,*	♂,	,,	Mexico ...	182	158	176	162

The conclusion to be drawn from the foregoing table, which, without difficulty, might have been increased fivefold, is that in wolves and wolf-like *Canidæ*, the tibia is always longer than the radius, ‡ but the ulna, which is very nearly the length of the fore arm, always happens to be longer than the tibia. It appears evident that Temminck, in his account of the length of the "*avant-bras,*" measured the ulna and radius, adding by some mistake the words *ou le radius* to the "*avant-bras,*" instead of naming either both bones of the fore arm, or the ulna by itself.

Assuming this to be the case, we have a normal proportion between the fore part of the arm and the fore part of the leg, in the case of the European Wolf examined by him, consequently we may accept the measurements given of the Japanese Wolf without hesitation. Yet the ulna (*avant.bras*) appears to be somewhat long in comparison with the tibia;

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* Properly speaking, this is the length of ulna and radius, which alters very little.

† Interrogatively added for the skull in question.

‡ Compare the notes of L. v. Schrenck.

but this anomalous proportion in the above-mentioned wolves does not appear to be very important; either it is actually the case with the Japanese Wolf, or is to be explained by the fact that Temminck did not measure the bones in a disarticulated and clean condition.

It is impossible to obtain exact measurements from a natural skeleton with the ligaments or portions of them still attached. According to Temminck's notes, the legs of the Japanese Wolf being relatively shorter than those of its congener, it may be said that there is no check upon the length of the skull, which is omitted; yet it may be reasonably assumed that the skull of the specimen measured by him was of similar dimensions to that now lying before me. None of the wolves above mentioned has such a short tibia in comparison with the basilar length of skull.

In accordance with this are the conclusions of Prof. von Martens on the "Yama-ino," not from personal examination, but based upon Japanese pictures. In the zoological part of the 'Prussian Expedition to East Asia' (vol. i. p. 76), he says, "The Yama-ino is distinguished by its shorter legs, and therefore smaller size, and is the same species as that figured in the 'Fauna Japonica.'"

More important are the observations on Japanese Wolves by Mr. H. Pryer, of Yokohama, published in the 'Proceedings of the Zoological Society of London,' 1878 (pp. 115 and 788). Mr. Pryer there announced his having forwarded "a fine specimen of the Japanese Wild Dog" to the Zoological Society of London, and stated that he was endeavouring to acquire a live specimen of *Canis hodophylax*, thus distinguishing the Wolf of the Main-isle (Nippon), which he names *Canis hodophylax*, from the Wolf of the Isle of Yesso, identical with the Siberian Wolf, *Canis lupus*. He further remarks that *Canis hodophylax* is confined to the main island, and has a shorter muzzle than the Wolf of Yesso. Equally noteworthy is the opinion of Dr. Sclater on a living specimen of *Canis hodophylax*, presented to the Zoological Gardens of London by Mr. Heywood Jones. He says (p. 788):—"Judging from the present specimen of the Japanese Wolf, although nearly allied to *Canis lupus*, it would seem to be a distinct species, recognisable by its smaller size and shorter legs." In reply to further inquiries, Dr. Sclater briefly confirmed the above statement.

Taking all these criticisms into consideration, the result seems to be that the Wolf of Nippon,* known as *Canis hodophylax,* is a specialized form distinguishable from *Canis lupus* by its smaller size and shorter legs, as well as by certain peculiarities in the dentition; at the same time being more closely allied to the Indian Wolf, *Canis pallipes,* by the size of its skull and the shape of its teeth.

Yet on the Island of Yesso the true *Canis lupus* is generally distributed, as appears from Mr. Pryer's communication above referred to, and assuming that Prof. Brauns based his examination of Japanese wolves on specimens originating from Yesso,† his positive assertion of the identity of the Japanese Wolf with *Canis lupus* is thus fully explained. I am not aware whether Prof. Brauns has obtained specimens from the main island for examination. So far as I can see, he gives no notes of the dimensions of the skulls and skeletons. All the arguments summarised by me point to a separation of the Wolf of the main island from *Canis lupus,* and an alliance to *Canis pallipes.* I am therefore unable to agree with the opinion of Prof. Brauns that there "Certainly exists but one species of Wolf in the whole of Japan, *Canis lupus,* which is generally called *Ookami* by the natives, meaning "great spirit," sometimes also *Yamaimi,—i. e.,* "mountain dog" or "wild dog,"—and that all allusions to the existence of two species of wolves in Japan are attributable to the fact that the Japanese names for the Wolf are naturally enough bestowed on the Wild Dog, with which it is confounded. To me it seems rather that the existence of two species (or races) of Wolf, as affirmed by the natives, is no imagination, or resulting from confusion of a Wolf with a dog running wild. I purposely say dogs running wild or undomesticated; for if Prof. Brauns' expression "Wild Dog" be understood in its true sense,—that is to say, in the sense of an indigenous wild species of dog referable to the *Yamaimi,*—then I do not object, for it would be a mere contention about words to consider the *Canis hodophylax* as a small species of Wolf or else as a true species of Wild Dog. In either case we should have to contend for two wild species of *Canidæ* in Japan, *viz.*, the large Wolf of Japan and the small one (or Wild Dog) of Nippon.

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* According to Prof. Brauns, it is also found in the Southern Island of Japan.

† Perhaps on skins which, according to Prof. Brauns, are exported in considerable quantities from the Isle of Yesso, where this Wolf is very common.

Moreover, we have the statement of Prof. von Martens, who vouches for the existence of two species of Wolf in Japan. "I myself," he says, "have seen neither the Wolf nor the Wild Dog of Japan, but I am able to state, from the depositions of my Japanese servant, and from his explanation of some illustrated Japanese books at hand, that the natives distinguish two kinds of these animals, the one named *Yama-ino* (Wild Dog), the other *Oo-kami*. The latter, said to be more terrible and voracious, is represented in sculptures with horribly wide-opened jaws, and a human skull near it. The *Yama-ino* is distinguised by its shorter legs and smaller size," &c.

From this it seems to me that the *Ookami* is the larger and more dangerous *Canis lupus*, dispersed over Yesso, and the *Yama-ino* the smaller and feebler *Canis hodophylax*, living in the main South Island. Prof. Brauns also asserts that *Ookami* properly means the Wolf: a mistake if in the 'Fauna Japonica' this name was identified with "une espèce intermédiare entre le chien de chasse et le loup," such a species having no existence.

Comparing the affinities of the Japanese dogs living in a wild state with the Wolf of Nippon, I propose to publish my views in a separate treatise, having considerable material in the shape of skulls of these dogs. For the present my intention is merely to summarise the reasons which induce a separation of the small Japanese Wolf from *Canis lupus*. Whether it is to be considered a distinct species of the genus *Canis* or a well-marked race of *Canis lupus* is simply a matter of opinion. To my mind all recent and fossil species of *Canidæ* are closely united by slight and exceedingly varied modifications, which render it difficult to separate them specifically according to the old notion of species, showing as they do a significant tendency to variation and to the formation of local races.

Prof. Huxley, in his excellent paper on the characters of skulls and dentition of *Canidæ*,* remarks that "The existing *Canidæ* exhibit a gradual series of modifications in the form and size of their skulls and the number and characters of their teeth, from *Octocyon*, as the least differentiated member of the group to the Wolves, Lycaons, Cyons, and Northern Foxes, as the most modified forms." And in the course of his remarks on the limits of species he expresses the following opinion:—"As for species no one zoologist has ever yet agreed with the estimate of another as to what should be considered species and what local varieties among Wolves and Foxes; and, as there is no criterion by which the question can be decided, it is probable that such agreement never will be obtained. The suggestion that it may be as well to give up the attempt to define species, and to content oneself with recording the varieties of pelage and stature which accompany a definable type of skeletal and dental structure in the geographical district in which the latter is indigenous, may be regarded as revolutionary; but I am inclined to think that sooner or later we shall have to adopt it."

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* Proc. Zool. Soc. 1880, p. 284.

Although agreeing with this view of Prof. Huxley, I am nevertheless inclined to think it advisable to bestow specific names on distinctly prominent and local forms, whether species or races. Thus the small Wolf of Nippon should have a special scientific designation.

Unfortunately the name applied by Temminck to this animal is not a very suitable one, as Prof. von Martens rightly observes.* It would do well enough for those Japanese dogs which live in a wild state, but is not appropriate for a Wolf, which, according to Temminck, "lives in the wooded and mountainous regions of that island, *avoiding the inhabited parts.*" The orthography also varies in Temminck's work between *hodophylax*, *hodopylax*, and *hodophile* (*hodophilus*), with remarkable inconsistency. In view of this I beg to propose another name (instead of that unsuitable one) for the small Wolf of Japan, *Lupus japonicus*, to distinguish it on the one hand from *Lupus vulgaris* (Gray), and on the other from *Lupus pallipes* (Gray). In case it should be deemed better to retain the old specific name *Canis lupus*, characterizing the small Wolf of Nippon as merely a local race of it, it might be well to call it *Canis lupus* var. *japponicus*. As regards the probable origin of the Wolf of Nippon, it appears to me that two hypotheses may be considered—namely, that it is either a local race, which, from the insular nature of Nippon has developed into a peculiar form; or else that it appeared as an already distinct form from South-West Korea, extending as far as the Tsugaru Strait. Which of these two hypotheses is likely to be the right one may be a matter for further consideration. Perhaps both should be simultaneously considered.

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* Temminck's name *hodophylax*, from ὁδοφυλαξ, a watcher of the roads, a robber, seems to us a remarkably appropriate one for a Wolf.—Ed.

It would be very desirable to purchase further material, in the shape of skins and skeletons of *Lupus japonicus* for our Museums, if possible from the South Island (Kinsin). In view of the frequent communication which exists between Europe and Japan, this ought not to be a difficult matter.

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

By Montagu Browne, F.Z.S.
Curator, Town Museum, Leicester.

(Continued from vol. ix., p. 467.)

Fam. Sturnidæ.

Sturnus vulgaris, Linn. Starling. — Resident and commonly distributed; breeding, even in the town of Leicester. I saw many of these birds nesting in boxes in trees opposite the hall-door at Mr. W. Whitaker's, of Wistow, in May, 1885. One box, which was tenanted, was not more than ten feet from the ground. It is subject to variety. Davenport records a white one seen by him at Skeffington in September, 1878.

Pastor roseus (Linn.) Rose-coloured Pastor.—This species is inserted on the authority of Mr. Macaulay, who states ('Midland Naturalist,' 1882, p. 63) that one was seen near Foxton, about 1870, by the Rev. H. Matthews. It was in the company of a flock of Starlings. Since then, Turner has told me that a man named Collins, now deceased, received a specimen in the flesh from Enderby ten or more years ago.

Fam. Corvidæ.

Garrulus glandarius (Linn.). Jay. — Resident and generally distributed; breeding in various parts of the county. Davenport finds their nests and eggs every year.

Pica rustica (Scopoli). Magpie.—Resident, generally distributed, and breeding. Subject to variation of colouring. Davenport writes, "A white Magpie frequented the neighbourhood of Shearsby for a long time in the winter of 1881-2, and was seen by many people." He adds, "A Magpie begins to build, say, at the end of March, and takes about a month to complete her nest; let the eggs be taken, one week will suffice for the rearing of a second nest." Mr. J. W. Whitaker, of Mansfield, Notts, writes me that his brother, W. Whitaker, of Wistow Grange, shot a cream-coloured variety in 1880, and threw it away as of no value! He purchased in 1882 a snuff-coloured variety of the Magpie, said by the man who sold it to have been taken at Stoughton.

Corvus monedula, Linn. Jackdaw. — Resident, commonly distributed, and breeding in old steeples, &c., in the town of Leicester. Harley observed a pair nesting in the chimney of a small cottage standing beside the lane leading from Newtown Linford to Ulverscroft. Davenport reports a variety of the eggs taken by him in Launde Wood in 1881. Ingram tells me the Jackdaw harries Blackbirds' nests, and has no scruple in taking the callow young.

Corvus corone, Linn. Carrion Crow. — Resident, generally distributed, and breeding, but by no means common. Harley states that, "On the large grass lands in the southern division of the county, where game is much less cared for than in other districts, the Carrion Crow is certainly more abundant and more frequently met with." Davenport writes, "A very small dark green egg was taken (from a nest containing one other) by me near Rolleston in April, 1882; a precisely similar egg in every respect was taken near Rolleston in April, 1883, from a nest containing four others. Both eggs are in my collection. The old birds had frequented the neighbourhood during the intervening winter."

Corvus cornix, Linn. Hooded Crow; "Grey Crow."—An uncommon winter visitant. It is mentioned in Potter's 'History of Charnwood Forest' as having been seen near Charnwood Heath. Specimens are said to have been killed near Leicester. Harley says, "It is very sparingly distributed over Leicestershire, and chiefly limited in its range to the Forest of Charnwood and the surrounding district." Ingram writes, "Five or six pairs generally visit Belvoir every November, remaining until spring; often near the kennels, the smell of flesh attracting them. They do not remain to breed." Macaulay reports one obtained at Skeffington in 1875, and again in December, 1880. He also informed me of one seen by him at Saddington Reservoir, Jan. 7th, 1885. I obtained one from Rothley Plain on Feb. 2nd, 1881, and another, also in the flesh, on January 3rd, 1882, shot close to Leicester, both of which were purchased for the Museum. The late Mr. Widdowson informed me that these birds appeared in the vicinity of Melton nearly every winter. Mr. Ellis says that he sees a pair or two nearly every winter, and I myself, when driving near Bradgate, saw two on February 24th, 1882, sitting on an old tree. Elkington tells me (October, 1885) that he has in past years received several from Swithland. Turner reports one shot some fifteen years ago in the Abbey meadow, and the 'Leicester Chronicle and Mercury' of October 24th, 1885, records that a Mr. Bevin, of Dunton Bassett, found a wounded bird of this species there on October 16th, 1885. Since then it appears to have been unusually common. I purchased a male shot Cropston Road, October 31st, the stomach of which contained large quantities of the elytra of various beetles, and some few uninjured small snails. Another, a female, was shot at Cossington on Nov. 6th, and presented to the Museum by Mr. Thomas Woodcock, of Ratcliffe-on-the-Wreake; five others were seen near there on the 5th; one shot at Narborough by Mr. Everard about the same time. Mr. Davenport reports three seen at Skeffington on Dec. 5th; Rev. A. Matthews saw two at Gumley, and Mr. W. J. Horn shot one at Uppingham, Dec. 5th, and reports them to be quite common in that district.

Corvus frugilegus, Linn. Rook.—Resident, commonly distributed, and breeding in "rookeries" so close to the town of Leicester as Westcotes, Stoneygate, and Knighton. This bird is subject to much variety. The MS. Donation Book, Leicester Town Museum, records under date June 13th, 1850, a rather uncommon variety, "of a pale brown colour, shot at Stoneygate"; and under date May 25th, 1885, a pied specimen from Gopsall, and one with white wings from Belvoir was presented on June 24th, 1880, by Mr. Theodore Walker. I saw an immature bird shot at Wistow Park, May 20th, 1885, the beak of which was yellowish white, claws white, several of the toes barred with white, part of the head and chin white, as also several of the primaries and secondaries.

Corvus corax, Linn. Raven. — Rare. Has not occurred for years. In Potter's 'History of Charnwood Forest' it is stated that the Raven was "generally to be seen on Sharpley a few years since; still in Bradgate Park, as I learn from Mr. Bloxam." Harley states that a Raven reared its young at Garendon in 1825. He adds that the late Mr. Adams assured him that the Raven had entirely deserted Bradgate Park. It was met with at Sharpley Rocks in October, 1848. In the 'Midland Naturalist,' 1882 (p. 64) Macaulay reports one shot at Saddington many years since, while feeding on a portion of a sheep that had been hung up in a plantation, and another at Rothley, February 17th, 1881. This last is, however, an error; Macaulay's informant being incompetent to distinguish a Raven from a Carrion Crow. The late Mr. Widdowson wrote me that Mr. John Brown, of Oakham, had one or two that were taken out of a nest in Cottesmore Park, near Oakham, some years ago.

Fam. ALAUDIDÆ.

Alauda arvensis, Linn. Sky Lark.—Resident, commonly distributed, and breeding in fields close to the town of Leicester. Packs in flocks of many hundreds in winter. The MS. Donation Book, Leicester Museum, records a black variety from Belgrave, March 31st, 1860.

Alauda arborea, Linn. Wood Lark.—Resident, but not common. Harley says it is seldom met with, except in the more retired woodlands. Around Newtown Linford, Groby, and neighbouring districts the Wood Lark occurs, but even in such places it is not abundant. It builds on the ground in corn-fields, and rough places near the sides of thick woods and plantations. Never congregates in the winter months, like the Sky Lark. but remains solitary. I have not received it myself as yet, although both Elkington and Turner receive specimens occasionally, agreeing, however, that it is much rarer than formerly.

Order PICARIÆ.—Fam. CYPSELIDÆ.

Cypselus apus (Linn.). Swift; "Devilin." — A summer migrant; commonly distributed. Harley says, "With us this species nests in holes in old walls, and in the roofs of dwelling-houses and out-buildings. None of the churches in Leicester with which I am acquainted appear to have a colony of Swifts, the ugly roofs of the buildings not being at all favourable to the habits of the birds; and further, ever since I paid any attention to the manners of this bird I have never been more surprised at its temporary withdrawment than during August, 1848." On the 16th the Swifts withdrew, apparently altogether, where only a few days before the birds were abundant; but on the 24th, 25th, and 26th numbers returned in my own parish and at a small village hard by.

Cypselus melba (Linn.). White-bellied Swift; "Alpine Swift." —A rare summer migrant. Has been quoted in nearly every work since 1839 as having occurred in Leicestershire, on the authority of Macgillivray (Brit. Birds, iii., p. 613), which, with Harley's MSS. to guide me, appears insufficient, the bird having only been seen flying overhead, at some considerable distance from the ground. Mr. Harting, at page 201 of 'Our Summer Migrants,' allows it to be inferred that the above specimen (mentioned at p. 200) was shot.

Fam. CAPRIMULGIDÆ.

Caprimulgus europæus, Linn. Nightjar; "Goatsucker;" "Fern Owl."—A summer migrant, sparingly distributed, but doubtless breeding occasionally. Harley records it from Bardon, Oakley, Gopsall, Martenshaw, and Gracedieu. The MS. Donation Book, Leicester Museum, records one from Ashby-de-la-Zouch, September 2nd, 1874: one, Birstall, September 3rd, 1876; one, Belgrave, May 26th, 1877. The late Mr. Widdowson wrote from Melton, "Very few about here." Mr. Ingram writes, "Found every summer in Belvoir Woods, but less numerous than formerly; have not found its eggs." Mr. T. B. Ellis writes, "Rare, one or two generally at 'The Brand.'"

Fam. PICIDÆ.

Dendrocopus major (Linn.). Great Spotted Woodpecker; "French Magpie." — Resident, but not common, breeding occasionally. In Potter's 'History of Charnwood Forest' it is said to be "found in old woods all round the Forest, but is not very common." Harley says, "The species is seldom seen, except in the vicinity of the parks of Garendon, Donington, Beaumanor, Gopsal, and Bosworth." Sir G. Beaumont wrote to Mr. Macaulay that he had seen it at Coleorton. The Rev. A.

Matthews got a female bird of this species at Gumley in Nov., 1864; and Mr. Davenport informs me that one was killed at Loddington in 1881, and that he saw a pair in May, 1881, in Loddington Redditch, and one in November, 1883, in Nosely Park. Mr. Ingram writes, "Occurs in the Belvoir Woods, and breeds occasionally; seen in orchards; a shy bird." Widdowson wrote, "Occurs most years about neighbourhood of Melton." I bought a female Great Spotted Woodpecker, said to have been procured from Ansty in the autumn of 1883; and have seen a fine male, shot by the late Mr. Wm. Sansome in the vicinity of Narborough some fifty or sixty years ago. Mr. T. B. Ellis writes, "Frequents the larger woods; one or two pairs frequent Bardon Wood"; and, as a proof of this, a fine male specimen was shot by the keeper at Bardon Hill on May 15th, 1885, and presented to the Museum by Mr. B. N. Everard.

Dendrocopus minor (Linn.). Lesser Spotted Woodpecker.—An uncommon resident; breeding occasionally. It is included amongst the birds of Charnwood Forest as having occurred near Groby. Harley says, "Near to Leicester it affects the elms standing on the grounds at Dannett's Hall and Westcotes; and near to the town of Loughborough is known to haunt the trees at Burleigh Fields, and also at Market Bosworth." Mr. Macaulay writes, "Still rarer than the last-named. In the summer of 1878 a pair built in an orchard at Gumley, and hatched off on May 26th; but (unfortunately) the young were destroyed, and the old bird captured." Mr. Davenport reports it as "building at Rolleston," and he obtained a male in Cold Overton Wood in January, 1884. The late Mr. Widdowson wrote, "Last winter (1883) a pair frequented Lord Wilton's Park all the winter, but did not remain to breed." Elkington told me of one procured at Woodhouse Eaves in 1883, and I purchased from him a female bird, shot at Humberstone on Dec. 19th, 1885.

Gecinus viridis (Linn.). Green Woodpecker; "Yaffle;" "Rainbird."—Resident, and generally distributed. I have procured specimens from Ansty, Bradgate, Cropston, Kibworth, &c.; and Davenport writes, "I found on May 13th, 1885, a Green Woodpecker's nest at Keythorpe, in a small hole in a tree not three feet from the ground. On enlargiug it (in no very careful manner) I found nothing in it. Passing by on the 18th, to my amazement the bird flew out again; this time there were five eggs; by the

22nd four more were laid; on the 27th, two; and on June 3rd, three; making a total of fourteen!"

Jynx torquilla (Linn.). Wryneck; "Cuckoo's Mate;" "Snake-bird."—A summer migrant, sparingly distributed, and becoming less common than formerly. Harley says, "The Wryneck nests with us, breeding in holes in orchard and forest trees. It appears nowhere more common than around Foxton. The ash prevails there, and, moreover, ant-hillocks abound to a much greater extent than in any other district known to us." According to Mr. Macaulay ('Midland Naturalist,' 1881, p. 255), a pair built that year in a garden at Kibworth, and were not disturbed.

Fam. ALCEDINIDÆ.

Alcedo ispida, Linn. Kingfisher. — Resident, and generally distributed. Elkington reports several from the vicinity of Leicester during the winter of 1884-5. I have repeatedly observed specimens on the brook at Knighton, and on the Soar at Aylestone. It has, I believe, bred at Bradgate, Blaby, Bosworth, Desford, Stapleford Park, &c.; and on May 22nd, 1885, Master George Snoad presented to the Museum four fresh eggs,—being part of a clutch of nine,—taken from a hole in a clay-bank by a little pond close to the Aylestone Road, at some distance from the river. The eggs, laid upon fish-bones, were, before being blown, of a delicate pink hue.

Fam. UPUPIDÆ.

Upupa epops, Linn. Hoopoe. — An occasional spring and autumn visitant. The first notice I can find of this bird is contained in the catalogue of the contents of the Museum, when handed over by the Literary and Philosophical Society to the Corporation of Leicester on June 19th, 1849:—"1 *Upupa epops*, shot in Leicestershire." Harley writes, "This species has occurred in the county in immature plumage, a fine example having been shot in the lordship of Stapleton on September 15th, 1851. This was presented by him to the Town Museum, where it is still preserved (1885). The Hoopoe is said to have occurred also at Bradgate Park, and near Lutterworth. The MS. Donation Book, Leicester Town Museum, records the presentation on June 26th, 1867, by Mr. C. Burdett, of another example (still in existence) "shot in the county of Leicester." I saw a very fine one, apparently a male, of a deep buffy pink and pure white and black, resembling the most richly-coloured South European specimens (of which I have shot many), in the hands of Elkington. It had only been that day set up, and was shot at Great Peatling on May 11th, 1883, by Master Hall, of that place. Mr. W. A. Vice, M.B., has told me since then that another one was in its company.

Fam. Cuculidæ.

Cuculus canorus, Linn. Cuckoo. — A summer migrant, generally distributed, and laying its eggs in other birds' nests as close to Leicester as at Aylestone and Knighton. Harley remarks that, although it chooses a foster-mother to hatch its egg or eggs, "yet when its offspring comes abroad on wing" he has "noticed its anxiety to provide for the same, much in the manner of other birds," and gives an example proving this. He remarks also that "it is liable to albinism," but this I cannot confirm. The Rev. A. Matthews, of Gumley, wrote in 'The Zoologist,' January, 1885, p. 25, relative to an immature male found on July 12th, apparently killed by flying against a tent-rope in the garden, and he argues therefrom that the bird was migrating during the night. With all deference to my friend's opinion, I would contend that the date is early for migration (a young bird was killed with a stone at "Forest Rock," August 8th, 1882); and, secondly, that there is no evidence that it was not killed in the early morning during ordinary flight, as the late Mr. R. Widdowson wrote to me. "Last spring (1883) I had four brought to me in one week, all killed by flying against windows." Mr. Davenport writes, "Found an egg in the nest of a Sedge Warbler in a small plantation near Ashlands in June, 1883. The Cuckoo flew and settled on the nest, and remained there quite fifteen minutes." Mr. Macaulay reports, "April, 1881, Cuckoo in Wagtail's nest at Saddington." Ingram writes, "Becoming more numerous; the Wagtail, its favourite foster-mother, often rears the young in the precincts of the garden at Belvoir." Mr. John Ryder, lodge-keeper at Belvoir Castle, informed me that in the spring of 1884 a Cuckoo laid an egg in a Robin's nest built in a bank by the lodge, and the young Cuckoo was reared by the Robins. On June 28th, 1883, I went to see a young Cuckoo in a Hedgesparrow's nest, built in some sticks amidst a thick growth of nettles and thistles, not more than twenty yards from the back door of Mr. Wm. Lander's farmhouse at Knighton. The young usurper, at my approach, ruffled its feathers and drew back its head, and then darted out its neck with the most threatening gestures, uttering at the same time a sharp hiss; indeed its actions, though ludicrous to a degree, were a remarkably good imitation of those of a snake. I found an unbroken egg of the Hedgesparrow just outside the nest, and saw that the foster-mother fed her ugly charge with larvæ, chiefly of sawflies. The identical group is now in the Museum. Mr. Wilson, of Aylestone Mill, found in July, 1885, a young Cuckoo in a Reed Warbler's nest built by the side of the river, not twenty-five yards from the Aylestone Road tramway.

(To be continued.)

NOTES AND QUERIES.

Marine Biological Association.—We are sure zoologists generally will hear with satisfaction of the recent decision of the Treasury with regard to this excellent institution. Their Lordships have determined to submit to the House of Commons an estimate by which the Association will receive £5000 in two annual instalments, and thereafter £500 a year for five years. The conditions attached to this grant appear to be altogether such as the guardians of the public purse may well enforce, and we understand that they have all been acceded to by the Council. At the same time it is to be understood that the Association still stands in need of funds, and that, although its work will shortly be commenced, it remains for future benefactors to strengthen and widen it. With the New Year Mr. Walter Heape, M.A., who has been for some time Demonstrator in Animal Morphology at Cambridge, will enter on his duties as Resident Superintendent at the Marine Laboratory at Plymouth.

MAMMALIA.

Habits of the Squirrel.—In his description of the Starlings and Sparrows squabbling over the eggs on his lawn (Zool. 1885, pp. 431, 432), the Rev. J. C. Atkinson appears to attribute the removal and destruction of the eggs of *Picus major*, described by me in the same volume (p. 229), to the proprietors of the nest themselves, or to other birds of the same species. Or does he accuse the Sparrows and Starlings of the robbery? I cannot quite understand his meaning; the only point on which I feel sure is that he repudiates the idea of a Squirrel committing such an atrocity, and treats my theory with disdain. The question is an interesting one, however, apart from this one disputed case, and I am pleased to be able to produce some further evidence in support of my views, which may perhaps have a more convincing effect on the tender-hearted champion of the Squirrel. As regards the nest of *Picus major*, I have only to add that there are unfortunately very few pairs of this Woodpecker in the locality,—far too few for jealous squabbling over their eggs,—while there are no Sparrows and hardly any Starlings nesting in the immediate vicinity of the particular tree. It can scarcely be considered a difficult feat for the Squirrel to carry out the "practical joke" of removing eggs from such a nest, only nine inches below a comparatively large entrance hole. No one who has kept, or even carefully observed, a tame Squirrel, and has seen the extraordinary way in which he can force himself through a small aperture, would be the least astonished thereat. From the information in my possession I will make the following extracts:—Col. George Sulivan, of Warmwell, near Dorchester, writes—"I look upon a Squirrel as a very destructive animal amongst eggs, and anyone who contradicts this statement shows his ignorance. I knew of a Pheasant's nest in a rose-bed close to our drawing-room window; it had fifteen eggs, and my father, who was laid up with gout, and always laid on the sofa by the window during the day, seeing a Squirrel constantly going from a fir tree covered with ivy to the rose-bed, asked me to see if the nest was all right. I did so, and found all the eggs gone. He then ordered the gardeners to get a long ladder and examine the tree up which the Squirrel always went, which was done, and the shells of the eggs were found in an old nest, after which all Squirrels were ordered to be killed. Again, I had when at Broke Hall a pair of tame Doves, and they had a nest in a tree close to the hall. One day I saw the Doves in a great state, and went to see what was wrong, when I saw my friend the Squirrel. Needless to say, I got my gun and shot him; he had destroyed the nest. Squirrels will also destroy young Wood Pigeons by biting them and throwing them out of the nest; I have picked up numbers thus killed, and have baited traps with them and caught the brutes." Lord Lilford informs me:—"A tame Squirrel that I kept years ago was exceedingly fond of birds' eggs; of course it is an acquired taste, but I feel no doubt whatever that Wood Pigeons are the principal sufferers from it." One of Lord Lilford's keepers, H. Cook, told me that he watched a Squirrel in the act of sucking a nest of four Thrush's eggs in the Lynch Wood at Lilford, two years ago. He waited a moment or two before going up to the nest and disturbing the animal, which had made a hole in the eggs and sucked the contents. Mr. Charles Radclyffe, of Hyde, near Wareham, informs me that he has frequently seen Squirrels coming down trees from Wood Pigeons' nests with the eggs in their mouths and going up other trees with them. He is not sure if they carried them unbroken, or put their teeth into them to hold them better. He has seen one crossing a meadow near his house with an egg in its mouth. Lightfoot, Mr. Radclyffe's head keeper, a most reliable man, tells me he has repeatedly seen them carrying off hen's eggs from outlying nests. Though I have somewhere read of their doing this before, I have never previously come across an eye-witness of the feat. All my questions failed to shake his evidence, and he laughed at the idea of anyone doubting the egg-stealing propensities of a Squirrel. The above facts are, I venture to think, tolerably conclusive. In addition, I have testimonies from all sides to the frequent capture of Squirrels in traps set for Jays, &c., baited with birds' eggs; but this is too well-known an occurrence to be of much weight in conjunction with such evidence as that already adduced. I hope the subject will not be allowed to drop, and that others may contribute the result of their observation and experience to the discussion; for however admirable and excellent the Squirrel may be from what I may term an "æsthetic" point of view, there seem to me the gravest reasons for withholding from him the support of the lover of birds and the sportsman, as well as that of the forester.—S. G. Reid (Capt., late R.E.).

Food of the Common Shrew.—During last April my brother, having found the pupa of some large moth, placed it for the time being on the window-sill outside. Sometime afterwards, while indoors and looking out of the window, he saw a Shrew come up to it, seize and carry it off. The window is rather low, and is partly surrounded by the branches of a large old pear tree. A few years ago I caught several specimens of the Common Shrew, *Sorex tetragonurus*, in a meadow in which were a good many patches of more or less dry cow-dung, many of which had been tunnelled in various directions by these little animals, doubtless in their search for the grubs which usually occur in such situations.—G. T. Rope (Blaxhall, Suffolk).

BIRDS.

American Golden Plover and Richard's Pipit in Scotland.—I wish to record, through the medium of your pages, the occurrence in Scotland of two rare birds in my collection which have not been previously recorded—namely, the American Golden Plover, *Charadrius virginicus*, and Richard's Pipit, *Anthus Ricardi*. The circumstances under which the American Golden Plover was obtained are as follows:—On August 3rd, 1883, Mr. P. D. Malloch, fishing-tackle maker, of Perth, was walking near Perth, when the bird in question crossed the road in front of him; he fired and killed it, and, thinking it a pretty bright specimen in change of plumage, took it into his shop next day, mounted it, and put it in his window. I happened to come in two days after, and as I wanted a Golden Plover just beginning to lose the summer plumage I told him to convert it into a skin for me, which accordingly he did. On the 10th of October last I happened to be staying with Mr. Harvie Brown, and there I met Mr.

Bidwell, who in the course of conversation informed me that he had first discovered the Asiatic Golden Plover in this country, remarking that one of the distinguishing features of the latter bird was its having brownish grey instead of white axillaries. On my return to London, when looking over my series of Plovers, I was surprised to find the specimen in question was grey under the wings. On comparing it with specimens of *Charadrius pluvialis* I found it differed in other respects, the colouring being richer, and spots on the wing more boldly marked, and the bird altogether smaller; the wing measures 7·2 inches, and from the end of the innermost secondaries to end of primaries, 1¾ inch in length. I of course thought it was the Asiatic Golden Plover, but on showing it to Mr. Bidwell, Mr. Gurney, and Mr. Seebohm, they were all of opinion that it was *Charadrius virginicus*. The Richard's Pipit, *Anthus Ricardi*, I shot myself on August 2nd, 1880, at Dalguise, a small village about seven miles north of Dunkeld. I used to go every year and shoot young Oystercatchers and Curlews along the Tay, on the island opposite Dalguise House, where they breed in large numbers; and to reach the river from the road it is necessary to follow a small brook and climb a paling. There were always numbers of Meadow Pipits there, and that day proved no exception; but sitting amongst them was a bird which I at first took to be a Lark, but standing so high on its legs I thought it seemed rather curious, so I shot it, and having skinned it, put it in my collection amongst my Larks, not knowing then that there was such a bird as Richard's Pipit.—J. GUILLE MILLAIS (2, Palace Gate, W.).

Recent Occurrence of the Sea Eagle in Kent.—The recent occurrence on two occasions of the Sea Eagle, *Haliaëtus albicilla*, in Kent, no doubt whilst on their southern migration, is a matter of much interest. Both specimens are young birds; one, a female, shot at Minster, early in November, is described by a local ornithologist who examined it as measuring 3 ft. 1 in. in length, with an expanse of wings of 8 ft., and weighing 10 ℔s. The second bird, a young male, shot at Eastwell Park, is smaller than the other, and perhaps related to it, differing also in having the neck-feathers of a rich dark brown, instead of the grey-tipped feathers of the female. I send you photographs of both. It appears that a third Eagle, perhaps of the same species, has lately been observed in the same county, on the property of Mr. W. Erle-Drax, at Olantigh Towers, though all attempts to secure it have so far fortunately been unsuccessful.—PERCY E. COOMBE (23, Carlyle Square, S.W.).

[We are much obliged for the photographs, which have duly reached us. They show clearly that both the birds are young Sea Eagles, and not Golden Eagles, as recently stated in some of the daily papers.—ED.]

Woodchat and Serin Finch in Norfolk.—On May 16th I received, in the flesh, from Mr. G. Smith, of Yarmouth, a male Woodchat, *Lanius rufus*, I hear that several others were obtained on the East Coast further north. From the same source I also had a Serin Finch, *Serinus hortulanus*, shot in the Apollo Gardens, Yarmouth, June 14th. Unfortunately the specimen was so riddled with shot that proper identification of the sex was impossible, but from the plumage it was no doubt a male. This, I believe, is the first occurrence of this species in Norfolk, and will be a welcome addition to the already rich avifauna of that county.—R. W. Chase (Edgbaston, Birmingham).

FISHES.

Habits of the Holibut. — On my passage down the coast of Norway last autumn we put in (among the numerous other places), on the morning of October 15th, to Stoksund (about N. lat. 64° 5′). This little station is completely land-locked, and the sea was as smooth as a mill-pond, without the slightest ripple. Presently the evenness of the surface was broken by the nose of a large fish appearing above it, and then, with a splash, appeared an enormous tail. This was continually repeated, and by degrees we made out that there were two noses and two tails, and that they belonged to two Holibuts (one being very large). They swam close past us, so that we saw a good deal of them; they appeared to be playing, much as two Seals or Otters might do, and enjoying the sunshine, the first we had had for ten days. This habit of the Holibut to come up from the depths with which one usually associates them (we were in twenty fathoms water at the time) was well known to such of the ship's company as were old fishing hands, but was a startling novelty to the purely sailor portion, as it was to myself, and will be, I think, to many readers of 'The Zoologist.'—A. H. Cocks (Great Marlow).

[The Holibut, *Hippoglossus vulgaris*, is the largest of the family of Flat-fishes. It is rarely that one more than five feet long reaches the London market, but one sent to Edinburgh from the Isle of Man weighed 320 lbs., and measured 7 ft. 6 in. by 3 ft. 6 in. On the coasts of Iceland, Greenland, and Newfoundland they attain a much larger size, and specimens have been occasionally captured which reached 20 ft. in length. On the Norwegian coast the fishery is carried on in spring when the nights are clear, so that the fish may be seen on the bottom.—Ed.]

Food of the Rays.—All the Rays are constantly found to feed much on sand-eels whenever they can obtain them, and on the flowing tide come into quite shallow water in quest of them on the flat sandy beaches all round the coast, constantly frequented by sand-eels in more or less abundance. On one occasion, having baited a trot or long-line with sand-eels, and shot it at low water on the sands of Whitsand Bay, six miles from Plymouth, out of thirty-eight hooks I found at the next low water eleven hooks occupied by Rays of good size, making altogether so considerable a weight that I found it more convenient to send down a horse and sledge-box to draw them up the zigzag cliff path than remove them by any other mode of conveyance. They feed also on cuttles and squid; I have taken them myself with these, and hundreds are constantly taken on the long-lines with this bait, shot in deep water, by the Plymouth and Brixham fishermen. The whelk is also a favourite food, and on the coast of Lincolnshire, at Sutton-on-Sea, and elsewhere, short stakes are stuck into the clayey foreshore, and a single hook fastened to each baited with a whelk. Skate are constantly taken. So stiff is the clay foreshore that the stakes remain a considerable time before they become uprooted by bad weather.—J. C. Wilcocks (Plymouth).

MOLLUSCA.

Varietal Nomenclature. — Under this heading, in the December number of 'The Zoologist' (pp. 485–6), there appear some criticisms, purporting to be in answer to certain remarks of mine concerning the inexpediency of naming varieties of Mollusca. It seems to me that a more apt illustration of the truth of my remarks could hardly have been penned, if intended. Almost at the outset an illustration is furnished to my objection that the creation of these varietal names is mischievous in encouraging "too close an insistence on trivial and valueless minutiæ, to the overlooking of the broader generalisations that underlie them." The concluding sentences of my article entirely preclude the idea that by "rufous type" I meant anything approaching a so-called "var. *rufa*." "Type" was, of course, used as a convenient word implying "group" or "class," though not exactly synonymous with either. Unfortunately no room seems to be left for generalisations in the doctrines of the variety-making school, nor do they apparently recognise the fact with which every naturalist should be familiar, that these variations are not fixed quantities, but merge into each other and combine to any extent: hence a string of names has to be employed, as admitted by my critic, or, in a word, each individual specimen has to be *described*, since each differs from its fellow. Varietal names are not given to human beings according to the colour of their eyes or the differences in their stature; nor, as a friend suggests, are cats divided into varieties according to the number, presence, or absence of rings on their tails. *These are matters of individual description, and should remain as such*, in snails as in other things. This, though he fails to perceive it, is the tendency of Mr. Cockerell's system of nomenclature, if such it can be called: "*major-depressa*, *tenuis-efasciata*, &c.," are descriptions, not names. For convenience, specialists might employ abbreviations of well-known terms (and, as a matter of course, by preference of Latin origin), placed in brackets after the specific name, to denote such departures from the type as might be worth chronicling. Thus *alb.* would stand for all *white* specimens of a usually coloured shell; *hyal.* for transparent ones; *ten.* for extra *thin* but not transparent, *preten.* for very abnormally thin ones; *sol.* or *crass.* for extra thick examples, *persol.* for very abnormally thick ones; *depress.*, *conoid.*, and *acu.* for variations in form dependent upon the shape of the spire; *scalar.* for scalariform individuals; *sinist.* for reversed ones; *deform.* for obviously damaged or distorted specimens; *decoll.* for decollated examples; *cost.* for transversely ribbed; *stri.* for spirally striated; *unicol.* for specimens in which the coloration usually variegated is uniform and without markings; 1-*zon.*, 2-*zon.*, 3-*zon.* (or 1-*fasc.*, 2-*fasc.*, 3-*fasc.*), &c., to denote variations in banding (the usual band formula being retained for *Helix nemoralis* and *H. hortensis*); *ezon.* or *efas.* for bandless examples when bands are usually present. With respect to variations in the ground colour, greater care must be taken, as the terms used should be made to embrace as wide a generalisation as possible; but *ruf.* and *flav.* might be employed to denote changes in this respect quite apart from other variations such as those of markings or shape. These could be further supplemented, where necessary, by *oliv.* and *virid.*, &c. Other terms will, doubtless, suggest themselves, and be brought into use as required. Variations in size over and under the average should be indicated by actual measurements, not by the loose terms *major* and *minor*, which even Mr. Cockerell finds unsatisfactory. As many abbreviated terms of this description could, of course, be employed as required by the exigencies of the case. With regard to the question of trinomial nomenclature, which has been advocated by American ornithologists, it must be borne in mind that they propose to adopt it not for varieties that may occur anywhere, but for those which are confined to definite areas, to the exclusion of the type-form, and which have not unfrequently been described as distinct species. They do not, for instance, propose it for isolated cases of albinism, such as a white blackbird or rook. This is a vastly different thing from the course adopted by the namers of conchological varieties (so-called). If trinomial nomenclature be ever adopted in the case of Mollusca, it will be from the necessity of subdividing a large genus by inserting the subgeneric name, thus—*Helix Acavus aspersa*. Moreover, by giving names to each trifling departure from a purely arbitrary type, not only are unnecessary complications introduced and the literature of Conchology overburdened, but the study itself is degraded to the level of mere collecting for collection's sake, and no further benefit accrues to the collector than the magpie derives from its hoard, or the schoolboy from his accumulation of postage-stamps. It is, however, one step better than the continental plan of creating *species* out of bad varieties. Not only is it a waste of energy that might be more usefully directed, but in the end defeats its own object, for ultimately the whole of this laborious work must infallibly be set on one side. To the real student of Nature, on the other hand, there are many lines of research open even in this small department of Natural History. The lingual teeth of many species are still unknown, as is also the anatomy of many more. The food of most is but imperfectly recorded, whilst whether or no protective mimicry prevails amongst snails is but scantily guessed at. What influences the colouring, or want of colouring, in the shell, due allowance being made for the fact that when once a difference arises it is likely to be of frequent occurrence in that spot, owing to the very conservative nature of the Mollusca as regards heredity? What species will interbreed, and with what result? The very question of the inter-relationship between *Helix nemoralis*, *H. hortensis*, and *H. hybrida* is not yet satisfactorily determined, to say nothing of that existing between the various species of *Hyalina* (e. g., *H. cellaria*, *H. alliaria*, *H. Draparnaldi*, and *H. glabra*). These are some of the questions awaiting solution, if only patient investigators can be found; but they imply long and careful research amidst many disappointments, with no encouragement beyond the mere love of the subject, and the personal pleasure which is infallibly to be derived from the pursuit of such studies. Above all, it is necessary to avoid rushing into print with crude, half-developed ideas, or details of incomplete observations. Of course I cannot expect my variety-making friends to agree with me in all I have said, nor do I propose to carry the controversy any further. My sole intention has been to warn those who are really desirous to aid in the advancement of conchological science that the mere naming of varieties in no way tends to effect that object.— B. B. WOODWARD (British Museum, Nat. Hist.).

[We do not think anything will be gained by carrying this discussion further.—ED.]

Conchological Difficulties.— The notes on varietal nomenclature in 'The Zoologist' for December reopen the old questions, "What is a species, and what a variety?" Mr. Rowbotham seems inclined to deprecate the system of naming varieties, but he does not propose any system in place of it to embody the records which he admits are necessary. He states that differences in "size and colour" in shells are not important and ought to be excluded, and Dr. Jeffreys long since gave his opinion that "size, substance, sculpture, and lustre" are of little consequence. In considering therefore what is a variety, we should be almost entirely restricted to the form of the shell, together with any variation that might be noticed in the animal, and its habits, &c. I for one should be glad if Mr. Rowbotham could tell us what constitutes a true variety, if the above-mentioned characters are not to be taken into account. Whether the naming of varieties is an advantage or disadvantage, looked on scientifically, there is no doubt that it encourages industry, observation, and discrimination, and acts as an incentive to collectors to seek for new forms; whilst, on the other hand, the system of "lumping," in my opinion, checks research. I believe that observations, if accurate, cannot be too numerous. The numerous descriptions of present variations, if not of much use in the present generation, may be of the greatest utility to future investigators.

It would greatly facilitate study if leading conchologists would discuss the matter with the view of coming to some determination as to what should be considered a species, a subspecies, or a variety, and then to formulate standard rules for the guidance of collectors. If we could discover the *causes* of variation, we should be able to judge whether any particular form was likely to gain ascendancy in the struggle for existence, remain at a standstill, or drop out of the race. As to colour-variations, these may be much more important than they are assumed to be. The existence of many species may depend upon colour. There is a strong tendency amongst Mollusca, as well as amongst other creatures, to exhibit the colour of the soil or other surroundings in or on which they live. In Craven, where there are few hedges, I have noticed that very many individuals of *Helix rufescens* are of a greyish colour, assimilating to that of the walls on which they are found; whilst in the flatter and more wooded parts eastward they are dark brown or rufous, corresponding with the colour of rotten bark or decayed leaves. On the red clay or sand the red or reddish-brown shells of *Helix nemoralis* predominate over other colours. The similarity in *form* of the shell of *Clausilia laminata* to the elongated bud of the beech has been often noted. In my opinion our brightest coloured shells are becoming obliterated, or are gradually assuming the colours of the soil or rocks on which they are found. Mr. Woodward states (p. 412) that thin shells are the result of a deficiency of lime. I should rather think that thin shells are those which have only just arrived at maturity, and that they will thicken with age. I have found some very thin adult shells of both *Helix nemoralis* and *aspersa* on soil that was all lime, and very thick ones where there was next to none.—G. Roberts (Lofthouse, Wakefield).

PS. At p. 475, in the last number, the words "to be continued" have inadvertently appeared, the article being concluded.

SCIENTIFIC SOCIETIES.

Linnean Society of London.

November 19, 1885.—Prof. Moseley, F.R.S., in the chair.

Mr. A. D. Michael exhibited and described the remarkable nymphal stage of *Tegeocranus cepheiformis*, a species of the group Oribatidæ, which he lately discovered for the first time in England. He has furthermore succeeded in tracing the whole life-history of this animal. The creature in its nymphal stage is exceedingly strange and beautiful. It carries on its back as concentric shields the dorsal portion of all its cast-skins, and these are bordered by projections each bearing a rose-leaf-like cuticular process of transparent membrane with chitinous nervures. The drawing of the nymph was first sent to Mr. Michael, two years ago, by Herr Pappe, of Bremen.

Mr. C. Stewart demonstrated, under the microscope, the stridulating apparatus of a species of *Sphærotherium*, differing in some respects from that described by Mr. Bourne (*infra*).

Dr. J. Murie exhibited and made remarks on the caudal end of the spine of a Haddock with an arched deformity, recalling what is recorded of the so-called Hump-backed Cod, *Morrhua macrocephala*.

Prof. P. M. Duncan read a paper on the "perignathic girdle" of the Echinoidea. The author maintained that as the structures which give attachment to the muscles that protrude and retract the jaws of the Echinoidea (which are parts of the test surrounding the peristome within) are not homologous in all the families of the group, it is not advisable to retain the old name of "auricles." He would substitute the term "perignathic girdle." The girdle consists of processes usually united above (though occasionally disconnected), and of "ridges" which connect the processes on the side remote from the ambulacra. The ridges are modifications of the inter-radial plates, the processes developments from the ambulacral plates. In the Cidaridæ the muscular attachments are all on disconnected ridges, and there are no processes. In the Temnopleuridæ, Echinidæ, Echinometridæ, and Diadematidæ, the retractor muscles are attached to "processes," which are growths of the poriferous portions of the ambulacral plates; and the protractor muscles and ligament of the radiales are attached to the ridge which is developed on the inter-radial plates, and is united by suture to the base of the "process." In the Clypeastridæ there are disconnected growths, which carry the jaws, and have slight muscular attachments. In *Clypeaster* there are ten processes, each arising from an ambulacral plate; and there are no inter-radial structures like ridges. In *Laganum* there are five growths, each arising from a first inter-radial plate; hence these are the homologues of ridges. The Clypeastridæ may thus be divided into two groups, on account of the presence of processes in one, and of the homologues of ridges in the other.

Prof. Moseley communicated a paper on the anatomy of *Sphærotherium* by Mr. Gilbert C. Bourne. The author remarked that while the general external features and specific distinctions of the genus had been amply discussed, the internal structure had hitherto received scant attention. Among other anatomical peculiarities he described a well-defined stridulating organ in the male. This consists of a prominent bolster-shaped swelling on the postero-external edge of the second joint of the second pair of copulatory appendages. The swelling occupies the entire margin of the joint, and shows a number of chitinous cross ridges and furrows. On the opposite interior surface of the last tergite are chitinous points. The former rasp-like organ of the second accessory appendages, when rubbed rapidly against the latter, produces a shrill note resembling that emitted by the House Cricket. A true auditory organ exists in the antennary fossa beneath the eye. The tracheal system is unlike the majority of that of the Diplopoda, rather resembling that of Chilopoda and Insecta, though differing in the branched spiral filament not taking origin directly from the stigmata themselves. It appears that the tracheæ of *Sphærotherium* are a transition from those of the Julus type to those of the Scolopendra type. It would thus seem that the character of the tracheæ, the curved alimentary tract, the numerous chitinous pieces composing each segment, and the presence of a special hearing organ on the head, mark off the family Glomeridæ (to which *Sphærotherium* belongs) very sharply from the other families of the Diplopoda.

Prof. Moseley then read the following extract from a letter by Mr. G. C. Bourne, who is now investigating the Natural History of the Chagos Archipelago, in the Indian Ocean:—"Diego, Garcia, Sept. 18th, 1885. . . . . . . Arrived here on the 15th. The climate at present is very wet, but the rainy season is nearly over. The lagoon is fifteen miles long by about five miles across, with three islands. The main one is covered with cocoa-nut trees and other vegetation. Judging by the fragments thrown up on shore, there is a great variety of Corals, *Tubipora* being abundant, though *Madrepora*, *Porites*, and *Mæandrina* are the commoner sorts; but *Fungia* and *Lobactis* are also plentiful. As yet I have seen but one lepidopteron and a few beetles. Birds consist chiefly of Noddies and Terns. Of Crabs, *Ocypoda*, *Gearcinus*, and various Hermit Crabs are in swarms. *Birgus latro* does not occur on our islet. *Periophthalmus* is in great quantity on the outer shores. I have found a peculiar Bryozoon growing on one of the buoys in the lagoon; also a remarkable-looking Sea Planarian of a rich purple-black colour. with a narrow band of bright yellow running round the margin of its body. Large black Holothurians are abundant."

Prof. Moseley afterwards read extracts from another letter of an Oxford graduate, Mr. Sydney S. Hickson:—"Talisse Island, N. Celebes, Sept. 5th, 1885. . . . . . . I have been able to make several dredging expeditions in shallow water, *i. e.*, to 20 fms. The straits are very rich in Antedons, one species of a bright emerald-green colour is abundant on the coral reefs between this island and Kinabohoutar. Not 100 yards from the house where I am now writing there is *Tubipora* (alive), *Heliopora* (alive), and of course numerous other species of Corals. At Limbè I found small pieces of *Stylaster* alive, but I hope to find it here also. Nautilus shells are common on the shore here, and I have noticed a few with the animal decomposing in them. I am told that they are sometimes seen alive on the surface of the water, but on the approach of a canoe they at once dive into the sea, and are then difficult to catch. I shall try lobster-pots and other dodges. . . . . *Lingula* I have not yet found, but am told by the Controller of the Senggir Islands that they are found in plenty there. . . . . Maleos are in abundance, and I caught any number of them and their eggs. At Koeang, when I was making the ascent of a volcano, I saw hundreds, many of them within a stone's-throw of me. I have found a cave filled with edible birds'-nests, but it belongs to a chief who is very jealous of it. I have been on one unsuccessful Babirussa hunt, but intend to organise another on Limbè Island. The Sapiutan, *Anoa depressicornis*, is common in some places. The Black Monkey, *Cynopithecus nigrescens*, is very common, being found in all the mangrove swamps. Earth-worms and Leeches I have not yet seen, but perhaps they will turn up in November or December when it rains. *Periopthalmus* is very common here, and I shall be able to make a study of it. There are plenty of Butterflies, but very few Beetles. . . . . . My thanks are due to Capt. McLean and the officers of the 'Flying Fish' for much help. My present plan is to stay here for some months, and do some quiet work; later on to go to the mainland to investigate the fauna of the great inland lakes, which is very interesting."

December 3, 1885.—Sir JOHN LUBBOCK, Bart., Pres., in the chair.

Sir H. E. Maxwell, Bart., Lieut.-Col. L. Blathwayte, aud Messrs. R. A. Baston, S. J. Capper, C. Ford, G. B. Howes, J. H. Gurney, jun., W. H. Jones, W. F. A. Lambert, C. T. Musson, W. D. G. Osborne, D. Petrie, and G. Thom were elected Fellows.

Mr. Vincent J. Chamberlain exhibited and made remarks on a specimen of Trap-door Spider and its nest from California.

Prof. T. Spencer Cobbold read a paper, "On Parasites collected by the late Charles Darwin," including a letter from Mr. Darwin when transmitting the specimens to the author in 1869, and followed by Dr. Cobbold's own memoranda concerning eight of these, whereof one only, *Distoma lncerta*, proves to be new to Science.

A paper was read by Mr. P. Herbert Carpenter, "On the variations in the form of the cirrhi in certain Comatulæ." The shape and number of the cirrhus-joints of *Antedon phalangium* vary so greatly, both in the same individual and in specimens from different localities, that if the two extreme forms were met with in an isolated condition, they would assuredly be referred to different species of *Antedon*. The cirrhi of this species are classed by the author under four types:—(A) long-jointed; (B) intermediate; (C) square-jointed; (D) short jointed. A is the typical form which occurs in the Mediterranean variety, but is also found in the Atlantic specimens, together with B, and also but more rarely C; while D is confined to individuals from the Minch and the Ross-shire coast, occurring together with C, which is rare in examples from the Atlantic, except in those dredged by the "Dacia" on the Seine Bank.

A technical paper by Mr. Joseph S. Baly (Part I.), "On the Colombian species of the genus *Diabrotica*, with descriptions of those hitherto uncharacterised," was summarised by the Secretary. The author states that he has divided the genus into two principal sections, dependent on the relative lengths of the 2nd and 3rd joints of the antennæ.

December 17, 1885. — Frank Crisp, LL.B., Treasurer and Vice-Pres., in the chair.

Mr. Chas. Stewart exhibited the stridulating organs of a spiny Lobster, *Palinurus;* he showed under the microscope the file-like bow and its two tubercles, also by means of a softened specimen attached to the carapace he produced the peculiar grating noise which the animal makes during life.

A fine example of the Common Polecat, *Mustela putorius,* shot near Caermarthen, Wales, was shown for Mr. Edward A. Heath.

Mr. J. Jenner Weir drew attention to, and made comments on, the recently issued illustrated folios of 'Exotische Schmetterlinge,' by Drs. Staudinger and Langhams.

Mr. Frank R. Cheshire gave an epitome of his recent researches on the proboscis of the Bee, and explained the mode in which he believed the suction of nectar takes place.

Afterwards the following papers were read and discussed:—(1) Entomostraca collected by Mr. Haly in Ceylon, by Prof. George Stewardson Brady. The fresh-water forms were obtained at Colombo; the marine species were dredged at a depth of two fathoms, in the Gulf of Manaar. The fresh-water Copepoda and Cladocera approach well known European species. Among the Ostracoda is a curious new generic form, *Cyprinotes;* additional information is also given respecting *Cypris cylindrica* (*Malcolmsoni*) and *C. subglobosa,* &c. (2) A Monographic Revision of the Recent Ephemeridæ, Part IV., by the Rev. A. Eaton. (3) Colombian species of the genus *Diabrotica,* Part II., by Mr. Joseph S. Baly.—J. Murie.

Zoological Society of London.

December 1, 1885.—Prof. W. H. Flower, LL.D., V.-P.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's menagerie during the month of November, and called attention to a pair ef Pale Fennec Foxes, *Canis pallidus,* from the Soudan, presented by Capt. J. S. Talbot; and to twelve examples of the Spectacled Salamander of Italy, *Salamandrina perspicillata,* presented by Prof. H. H. Giglioli.

Mr. F. Day exhibited and made remarks on a very curious fish, supposed to be a hybrid between the Dab, *Pleuronectes limanda,* and the Flounder, *P. flesus.*

Mr. Sclater laid on the table specimens of some rare birds sent for exhibition by Mr. Whitely, of Woolwich, and called special attention to a Hornbill, which seemed to prove that *Buceros casuarinus,* described by Mr.

G. R. Gray in 1871 from the head only, was merely the young stage of *Bycanistes cylindricus.*

Mr. E. Lort Phillips exhibited a fine series of heads of Antelopes obtained during his recent expedition to Somali-land in company with Messrs. James, and read notes on their habits and localities.

Mr. W. T. Blanford exhibited, on behalf of Capt. C. S. Cumberland, the head of a Wild Sheep from Ladak, supposed to be a hybrid between *Ovis hodgsoni* and *O. vignei.*

Mr. John Bland Sutton read a paper, "On the origin of the Urinary Bladder," in which he endeavoured to show that the atrophy of the gills in all forms of the Vertebrates above the Amphibians might possibly be explained by the assumption of embryonic respiration by the allantois.

A communication was read from Lieut.-Col. Swinhoe, containing the fourth part of his memoir on the Lepidoptera of Bombay and the Deccan. The present paper concluded his description of the Heterocera; and also contained descriptions of the Tortricidæ and Tineina, which had been worked out by Lord Walsingham.

A communication was read from Dr. R. W. Shufeldt, containing a memoir on the comparative osteology of the Trochilidæ, Caprimulgidæ, and Cypselidæ. Dr. Shufeldt came to the conclusion that the Trochilidæ should form an order by themselves, and were not nearly related to the Cypselidæ, which were only much modified Passeres.

Mr. F. E. Beddard read the second of a series of notes on the Isopoda collected during the voyage of H.M.S. 'Challenger.' The present paper treats of specimens referable to the family Munnopsidæ.

A communication was read from Mr. Martin Jacoby, containing descriptions of some new species and a new genus of Phytophagous Coleoptera.—P. L. Sclater, *Secretary.*

NOTICES OF NEW BOOKS.

British Zoophytes; an Introduction to the Hydroida, Actinozoa, and Polyzoa found in Great Britain, Ireland, and the Channel Islands. By Arthur S. Pennington, F.L.S., F.R.M.S. 8vo, pp. i.—xvi., 1—363, pls. xxiv. London: Reeve & Co. 1885.

Mr. Pennington has set himself the task of furnishing "a handy and at the same time reliable manual of the British Zoophytes," rightly apprehending that such a work would be widely welcomed by the numerous naturalists who visit the seaside from varied motives.

A concise manual which obviates the necessity of taking down numerous books to the sea-side will always be valuable and popular, especially since the cost of anything approaching to a complete set of monographs is prohibitory to the great majority of field-naturalists. As Mr. Pennington's work is designed for this purpose, and is not intended to be merely a 'popular' book, it merits a careful scrutiny, as we have now arrived at a time when it is eminently desirable and comparatively easy to be perfectly accurate in structural details and in zoological nomenclature.

No practical naturalist will object to the title of the book or to the inclusion of the Polyzoa, but the omissions will lay the author open to some degree of criticism, since he states in the Preface he has "endeavoured to make the work a complete guide to all known British species."

The work commences with an interesting historical sketch, and general remarks on classification and distribution. The definitions of the groups of Hydrozoa and Actinozoa are unsatisfactory from the modern standpoint, and there are details of classification, as in the latter group, to which exception might be taken. Few zoologists now admit the Polyzoa into the subkingdom Mollusca: their nearest allies are certainly the Gephyrea, and Mr. Pennington should have referred his readers to Prof. Lankester's article, "Polyzoa," in the 'Encyclopædia Britannica.'

Before dealing with the systematic portion, Mr. Pennington gives a useful and on the whole an accurate summary of the anatomy of each group. The obsolete diagram of the Hydra (pl. i., fig. 1) should have given place to one which would really illustrate the text. The ectoderm and endoderm should be represented as distinct layers, and the generative glands are hopelessly erroneous. Prof. Lankester's article on the Hydrozoa (Encycl. Brit.) does not appear to have been sufficiently carefully studied. The discovery of nerve-cells in Hydroids by Weissmann and Von Lendenfeld is not mentioned.

The use of the term "stomach" in dealing with the anatomy of the Alcyonaria is somewhat obscure, as it might lead the reader to expect a tube or sac comparable with the stomach of other animals. The œsophagus is correctly stated in the account of the Actiniæ to be lined with ectoderm, but the reader is left to assume this for the Alcyonaria. The œsophagus is stated to lead into the stomach; the latter communicates directly with the body-cavity. Perhaps a better way of stating the facts would be to say that the œsophagus opens into the general cavity of the body, which is imperfectly divided into chambers by the mesenteries. The upper free edges of the mesenteries close round the included food, and digest it partly in the ordinary metazoon method, and partly by intracellular digestion, as in other Cœlenterata. It is only when the food is surrounded by the edges of the mesenteries that the animal can be said to have a "stomach," for the remaining endoderm has not been proved to be digestive in function, and when digestion is not taking place the mesenteries are freely suspended in the general cavity of the body.

Mr. Pennington has unfortunately ignored the British Association Rules for Zoological Nomenclature, as the following will show. Throughout the Malacodermata he has followed Prof. Andres in making his families end in *inæ* and his subfamilies end in *idæ*, but, as he has followed Dr. Hincks, he happens to be correct in the Hydrozoa and Polyzoa. Priority in synonymy has not been adhered to throughout; the following will serve as examples:—*Peachia* (Gosse) takes precedence of *Siphonactinia* (Dan. & Kor.), and *Flabellum arcticum*, Sars., should be *F. laciniatum*, M. Ed. & H.

No mention is made of the following:—Hydrozoa—*Allopora oculina*, Ehr., *Staurocoryne wortleyi*, Rotch, *Campanularia calceolifera*, Hincks, *Lafoëina tenuis*, Sars. Actinozoa—"*Halcampa*" *microps*, Gosse (one of the *Edwardsidæ*, probably an immature form), *Halcampa fultoni*, St. Wright (a parasitic anemone, also immature), *Actinia cylindrica*, Reid (= *Peachia hastata*, G.), *Actinia* (*Heliactis*) *alba*, Cocks, *Sagartia* (*Thoe*) *pellucida*, Cocks, *T. alderi*, Cocks, *T. yarrellii*, Cocks, *T. bellii*, Cocks, *T. hastata*, E. P. Wright, *Bunodes monile*, Templ., *Acthelmis intestinalis*, Fabr., *Polythoa rubicornis*, Holdsw., *P. anguicoma*, Norm., *Cerianthus vermicularis*, Forbes, *Ceratocyathus ornatus*, Seguenza, *Desmophyllum stokesii*, M. Edw., *D. crista galli*, M. E. & J. H., *Amphihelia profunda*, Pourt., *A. oculata*, Linn., *A. miocenica*, Seg., *A. atlantica*, Dunc., *A. ornata*, Dunc., *A. ramea*, *Balanophyllia socialis*, Pourt., *Pliobothrus symmetricus*, Pourt. It is true that some of these corals are deep-water forms, but they are entitled to rank as British. The subfamily *Cornularinæ* has been omitted, *viz.*, *Sarcodictyon* (*Rhizoxenia fide* Norman), *catenata* Forbes (= *S. agglomeratum*, F.), and *S. albicolor*, Norm. (possibly a variety of the former); also *Kophobelemnon mülleri*, Sars., and *Bathyptilum carpenteri*, Köll.; and several others.

Although the *Lucernariæ* are, strictly speaking, *Medusæ*, their habit is "zoophytic," and they might very well have been inserted, especially as the Rev. Dr. Landsborough described them in the prototype of this book. The only Medusa mentioned is the exotic fresh-water Medusa (*Limnocodium sowerbii*, Allm.), and this is inserted at the end of the Polyzoa.

The localities of several of the rarer species have not been recorded which have been added by Prof. Herdman from Lamlash Bay, by Drs. Leslie and Herdman from the Firth of Forth, and by other naturalists from various parts of the British coast. The following new species are imperfectly described and figured:—*Tubularia Britannica*, *Sertularia argentella*, and *Aglaophenia plumosa*.

In order that such a work as this should enable a beginner to identify any form he comes across, either of the two following conditions is absolutely necessary—(1) an accurate figure of a characteristic species of at least every genus, or (2) tables or analyses by which any genus or species may be ascertained. Neither of these is found in this book, and it is difficult to understand how anyone not previously acquainted with many of the species could hope to name his captures, especially since *all* the species are not described, even when mentioned; for example, *Edwardsia allmani*, M'Int., and *E. goodsiri*, M'Int., are merely referred to; unfortunately also they are placed under the genus *Edwardsiella*, although they possess less than twenty tentacles. (These forms will probably prove to be varieties of *E. beautempsii*, Quatr.). The bibliography has throughout the book been compiled in a perfunctory manner.

Nevertheless to the naturalist who already has some acquaintance with the forms described, and who requires a handy book of reference in the laboratory or at the sea-side, this work will prove very useful.

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